

# STUDIES ON THE DISTRIBUTION AND FORMATION OF THE MEADOWS IN CHINA

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## ABSTRACT

The lowland meadows are distributed on the Northeast Plains in the temperate zone in China, and its area became less and less with an increase of longitude. There are some regularities for the distribution of montane meadows, sub-montane meadows and cold-alpinal meadows. And the distribution and formation for meadows are independent upon the zonal climate and their environmental soil moisture.

## KEYWORDS

meadow, distribution, formation, zonal climate

## INTRODUCTION

There is a large area of meadows (about 100 million ha) in China. As a special natural resource, it can be used for developing farming lands or forests because of its rich biodiversity and high soil organic matter contents. Meanwhile, it is very important for meadows to maintain the ecological balance in the natural ecosystems.

## DISTRIBUTION OF MEADOWS

In China there are many types of meadows such as lowland meadow, montane meadow, sub-alpinal meadow and cold-alpinal meadow (Wu Zhengyi, 1980).

As a non-zonal vegetation, the type of lowland meadows in China is located on the plains and plateaus in the northern region of China. Its area is approximately 40 million ha, in the temperate zone in China. This type of meadow was formed with the conditions of higher underground water level and more soil moisture. And the dominant plant species of the vegetation on this meadow are herbage mesophytes. This type of meadow is located on the river cut plain, wetland, mall valley and river bottom. For some soil conditions there occurred the lowland saline meadows, lowland alkaline meadows and swamped lowland meadows, etc. the dominant species of the vegetation on the lowlands saline meadows are the saline-resistant perennial herbage mesophytes, and there occurred soil salinization or alkalization for this meadow in the Kerqin Plains and the Songnen Plains. For the swamped meadows hygrophytes and hydrophytes are the dominant species. This type of meadow is only located on the temporary river bottoms or wetland grasslands.

The montane meadow and sub-alpinal meadow formed under the more precipitation on the mountains. These types of meadows are mainly located on the alpinal and sub-alpinal forest zones. Most of the montane meadows and sub-alpinal meadows are located on the northern slope of the Daxinganling Mountains with the altitude of 300 to 1700 meters. There is a mosaic distribution pattern for the forest and these meadows. The area of these meadows is about 1.5 million ha.

As a singular type of meadows in China and the globe, the cold-alpinal meadow occupies the northeastern of the Qing-Tibet Plateau, and its distribution extends to several hundred kilometers for the horizon and several kilometers for altitude. In some great mountains there are cold-alpinal meadows with an altitude over 3000 m in the southwest and northwest of China. The total area of this meadow is

about 5 million ha. The altitude of distribution is lower and lower when these meadows extend to the desert region from the Qing-Tibet Plateau. The lowest distribution limit of this meadow on the alpinal mountains extends of the alpinal shrub zone, and its highest limit can reach the cold-alpinal polster vegetation and the cold-alpinal sparse vegetation zone. The dominant plant species on the cold-alpinal meadows are low and polster mesophytes.

## FORMATION OF THE MEADOWS

Like other vegetation types, all kinds of meadows are under the complicated natural conditions including different climate, air humidity, soil moisture and the disturbance to some extent from human beings. But meadows may form in the suitable water conditions (air precipitation, surface water, underground water and ice-snow water, etc.) and the colder climate. Usually there is a dense low temperature-resistant herbage layer for the cold-alpinal meadows.

In the temperate zone with less precipitation hydrologic conditions are the important factors which influence the formation of existence of meadows. When there are the suitable air precipitation and the higher underground water, and the soil moisture is saturation in the Plateaus and the Plains, meadows will form and have a wide distribution. There are a lot of saline meadows in the habitats with saline and alkaline soil. In the other cases such as cutting forest, irrigating farming lands for a long time, there occur the secondary successive meadows.

The montane meadow, sub-alpinal meadow and cold-alpinal meadow result from the changes of vegetation types with an altitude. In the mountains the formation and distribution of meadows are related to the mountain altitude, zonal climate and geographic location, because there is a special vegetation type adapting to environments, especially for the climate factor. For example, the zonal vegetation type - the cold-alpinal meadows form in the northeastern of the Qing-Tibet Plateau when there are strong monsoons from southeast and southwest, more precipitation higher air humidity and lower air temperature. The formation of cold-alpinal meadows also has something to do with the topography of mountains and the soil moisture. Usually, the cold-alpinal meadow is a component of the altitude spectrum of vegetation on the mountains (TCITCA, 1980).

## DISCUSSION AND CONCLUSION

In China the lowland meadows have a concentrated distribution on the Northeast Plains in the temperate zone, and the underground water is a limited factor for the formation and distribution of lowland meadows. The montane meadows usually form in the needle-leaved and coniferous mixed forest, deciduous broad-leaved forest and forest grassland on the mountains under the suitable temperature and humidity. Sometimes there are the sub-alpinal meadows located in the altitude vegetation spectrum on the Daxinganling Mountains and some higher mountains in the sub-tropical zone in China, and their location is equivalent to montane meadows. As a singular type of meadow, the cold-alpinal meadows are located not only on the Qing-Tibet Plateau, but also on the great mountains with an altitude over 3000 m in the northwest and southwest of China, and this meadow is greatly influenced by the cold-alpinal climate. For any type of

meadow in the plains, plateaus or mountains, its formation and distribution is dependent upon the zonal climate.

In the same climate zone, the distribution and formation of montane meadows and cold-alpinal meadows depend on not only the altitude of mountains, but also the latitude and longitude. Meanwhile, the distribution and change of different meadow types can show the regularity or characteristics of the zonal climate, especially for water and heat conditions.

The altitude of location for the cold-alpinal meadows on the mountains is gradually higher and higher from a higher latitude to a lower latitude in the same longitude region. So the altitude of mountains is an important factor for meadows because there are some regular changes of water and heat conditions with an increase of the mountain altitude. Thus the change of vegetation types or meadow types can reflect the comprehensive characteristics of climate, soil and other environmental conditions in a certain geographical location.

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